IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Smith	Docket No.:	101.00013
Application No.:	10/673,901	Group Art Unit:	3663
Filing Date:	September 28, 2003	Examiner:	Daniel L. Greene, Jr.
TITLE	Less Lethal Weapons And Methods For Halting Locomotion		

Commissioner for Patents
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DECLARATION UNDER 37 C.F.R. §1.132

I, Patrick W. Smith, do hereby declare and state as follows:

1. I am the Chief Executive Officer of TASER International, Inc. of Scottsdale, Arizona, the successor of Air TASER, Inc. founded in 1993. I was Chief Executive Officer and Co-founder of Air TASER, Inc. I am the sole inventor of the subject patent application having a priority date of September 17, 1999.

2. I hold a Bachelors degree with honors from Harvard University with a concentration in biology and heavy coursework in neurobiology. I also hold a Masters of Business Administration in finance from the University of Chicago and a Masters of Business Administration in international finance from the University of Leuven in Belgium.

3. In 1995, Air TASER introduced an electronic control device called the Air TASER model 34000 which was based on prior art technology, particularly on US Patent No. 4,253,132 to John Cover. Shortly after introducing the model 34000, I was invited to make a presentation of this weapon system to the national police of the Czech Republic in Prague. During the demonstration, the police asked if I would demonstrate the weapon on a volunteer. I agreed and a young cadet was selected. Prior to allowing us to shoot him with the model 34000 electronic control device, the cadet's training sergeant grabbed him by the collar, pulled his face to within 4 inches of the sergeant's, and proceeded to yell at him in the Czech language for about a minute. Clearly, the sergeant was motivating the cadet to fight through the effects of the model 34000. The cadet was then told to stand 10 feet from me and try to attach me.

4. On cue, I fired the model 34000 at the volunteer. To my shock and amazement, he grimaced, stepped forward, and proceeded to hit me repeatedly. The model 34000 barely even slowed him down. Embarrassed, I suggested perhaps the weapon was broken and that I should try another one. Same result. Searching for an explanation, I suggested that perhaps there was something "different" about the volunteer; perhaps he had some special capability. I repeated the test with 5 different volunteers and 5 different weapons, all with the same results.

5. I left the meeting embarrassed and humiliated. This was one of the first police demonstrations of the model 34000 weapon system which Air TASER had spent over a year developing and tooling, and it was a real disaster. I then undertook to survey police agencies which had used various other electronic control devices over the years. The results were consistent – they all reported that electronic control devices were effective against some people, but that the effectiveness of an electronic control device on a particular person seemed to be based largely on a psychological reaction to the pain caused by the electronic control device. End users advised me that electronic control devices were not effective against motivated subjects who were willing to withstand the pain, nor were they effective against people under the influence of drugs. Moreover, this was not just a problem with electronic control devices, but with all non-lethal weapons. From pepper sprays to rubber bullets, all non-lethal weapons relied on a pain response – requiring that the subject change his behavior voluntarily to avoid the pain. I learned that this was the primary reason why police had been slow to accept non-lethal weapons such as electronic control devices – they don't work against motivated or violent offenders.

6. Since before 1999 I am familiar with most, if not all, commercially available stun gun type products and the companies who marketed these products. John Cover held two pioneer patents that covered electronic control devices: US Patent 3,803,463 which expired April 9, 1991 and a continuation 4,253,132 which expired February 24, 1998. Prior to 1998, Cover's licenses limited manufacturing of electronic control devices capable of remote stun function to Air TASER Inc. and Electronic Medical Research Laboratories dba Tasertron ("Tasertron"). The market was further limited by Cover's US patent 5,078,117 covering the compressed gas

propellant system licensed for use in the cartridges for the Air TASER 34000, and later the TASER M26.

7. I am aware of at least 10 other companies who manufactured electronic control devices capable of only the local stun function according to "Stun Guns, and Independent Report" by *T'Prina Technologies* (1994).

8. The person of ordinary skill in the art of electronic control devices for local and remote stun functions in 1999 would have approached the design of a new weapon with the information and perspective provided in the recently published book, "A Guide to TASER Technology" by *Murray and Resnick* (1997), a 238 page paperback book, relevant portions of which are already of record in the present application. Co-author, Resnick was a principal of Tasertron. *Murry* includes then popular misinformation regarding the effect of electricity in the body. In describing the effect of an Air TASER 34000, Murry writes, "The Taser brings a suspect down *involuntarily* by interrupting his balance, causing him to fall -- or, on rare occasion, to become frozen in place." *Id.* at p.44 (emphasis in original). Some of this misinformation (*Murray* at p. 93) is disputed by *Kenny* (1999): "The Panel does not agree with the findings that Murray and Resnick (1997) report for incapacitation. The panel would like to clarify that current following the path of least resistance is a misleading statement. Current actually follows many parallel paths, some of which have more resistance than others. Pathways do not become exhausted or try to recover. They may be thinking in some vague way of nerves or muscles getting fatigued, but those are not current pathways. ... There is no clinical data available endorsing this theory. ... [M]uscles are not programmed. They may be stimulated through some as-yet-undefined mechanism. But even then, it is not an organized programming. In addition, a seizure is not what occurs: loss of consciousness occurs with seizures. There may be some pattern of muscle contractions, though we could not define any single such pattern watching those videos." *Id.* at p27.

9. The person of ordinary skill in the art could not be expected to bring together, as I did, some of the top talent in medical and electrical disciplines; but would rely on available information of the day including popular misinformation as discussed above.

10. The person of ordinary skill in the art of non-lethal weapon design at the time of my invention would have been an individual experimenter or a member of a small company of less than 20 employees operating on very limited private investment funds. Such a company would be prudent to avoid introducing a product that could be the cause of death of even a tiny percentage of the population because one or more wrongful death lawsuits would subject the company to such high costs of litigation and settlement that few companies that size nor their owners personal assets could survive.

11. To develop a better non-lethal weapon, I decided to perform experiments using anesthetized animals. This was a departure from the prior art best exemplified by the emphasis on pain compliance, discussed in US patent 5,698,815 to Ragner (1997) as the "feel" of a shock.

12. I personally researched some of the medical effects of electricity and designed the experiments discussed below. I also relied on medical consultants including Dr. Stratbucker who in 1984 evaluated the Nova XR-5000 electronic control device having only a local stun function. Dr. Stratbucker's report is available at http://www.nova-usa.com/stratbucker-study.html.

13. All of the electronic control device development work of which I was aware and that preceded my discovery involved testing on either un-anesthetized humans or un-anesthetized animals. Consequently, it was impossible to distinguish between the psychological reaction of the subject to the pain from the electric shock and the physiological response of the subject's skeletal muscles to direct electrical stimulation. It is my understanding that these prior studies were qualitative in nature, and the subjects were not given sufficient motivation to fight through the pain caused by the electric shock produced by the electronic control device. It is my understanding that these prior studies concluded that electronic control devices were "effective" based largely on the relatively predictable psychological response of the subjects to the pain produced by the electric shock.

14. With the exception of cardiac safety studies. Prior studies for medical safety reviews of electronic control devices used anesthetized animals to investigate cardiac affects, but none of these studies looked at the effectiveness of the electronic control devices in stimulating skeletal muscles.

15. Because my electronic control device effectiveness testing was performed on anesthetized animals, the anesthetic filtered out the animal's pain response allowing me to quantitatively measure the direct stimulatory effects of the electronic control device electrical output on the animal's skeletal muscles. My goal was to develop an electronic control device waveform that could truly incapacitate a human by overwhelming the motor nervous system and causing severe uncontrollable contraction of the powerful skeletal muscles by causing complete contraction of groups of skeletal muscles in response to a specific category of electronic control device electric waveform. I theorized that I might be able to design an electronic control device output capable of producing a state of complete physical incapacitation of a targeted human without causing cardiac fibrillation.

16. I developed a testing protocol and applied it to an anesthetized pig. Dr. Stratbucker performced the actual testing for me. For the testing, I developed an experimental electronic control device that had a variable output waveform. This experimental set up allowed me to vary the electronic control device pulse current level, pulse energy level, and pulse duration. In initial tests, we qualitatively observed the muscle contractions (or lack thereof) for each experiment. Subsequently, I measured and recorded the muscle contraction forces applied by each of the pig's four legs to strain gauges in response to a wide variety of different electronic control device output waveforms.

17. After the first battery of testing, I hired Magne Nerheim to design a new model electronic control device called the M26 that delivered the output waveform discovered in the first battery of testing.

18. This declaration includes two muscle response graphs that contrast the effect of the output of the Air TASER 34000 and the effect of the output of the M26. These graphs were prepared from measurements made on an anesthetized pig. Each muscle response graph includes four traces where the vertical axis of each trace plots the tension force produced by each of the pig's four legs, individually designated as "front left," "front right," "rear left," and "rear right." Each pig limb was pre-tensioned to a 10 pound force level to set a baseline before any electronic control device was applied.

19. The first graph titled "34000 Response" shows the small muscle contraction forces produced by the model 34000 electronic control device which generated a 57 mA (Irms) output current with an energy per pulse of 0.44 joules. Note, as shown in the first graph, that the model 34000 electronic control device caused only minor twitching force levels of only about 5 incremental pounds above the ten pound tensioning force in response to electronic control device induced muscle contractions.

20. The second graph titled "M26 TASER Response" shows the muscle contraction forces produced by a subsequently designed TASER model M26 electronic control device built to generate an output according to my experimental findings. The experimental results shown in the second graph result from use of a 162 mA (Irms) current from stored energy of 1.76 joules per pulse. Pulse width was about 13 microseconds per pulse. As shown by the second muscle response graph, the model M26 waveform which implemented my experiment-based findings caused severe and overwhelming muscle contraction forces of over 27 incremental pounds above the ten pound tensioning force, or more than 5 times the 5 pound muscle response caused by the model 34000 electronic control device, a device which at that time represented one of the most powerful prior art electronic control devices.

21. It is my understanding from reviews of competitors' advertising materials that manufacturers of prior art electronic control devices claimed that waveforms from their products incapacitated humans. Five police officers in Prague convinced me that the model 34000 electronic control device might have caused a significant pain response, but absolutely lacked the capability of halting locomotion by an individual.

22. It was only as a result of my extensive testing during the waveform development program described above that I was able to identify electrical output parameters which, when properly combined, yielded an electronic control device which was truly capable of repeatedly halting locomotion by a human target. The identified output waveform accomplishes halting of locomotion as opposed to partial incapacitation.

23. The output waveform resulting from the waveform development program did not trigger cardiac fibrillation. Nevertheless, I commissioned and participated in extensive animal studies at

the University of Missouri to prove that my newly developed waveform did not adversely affect cardiac tissue and was medically safe. Dr. Wayne McDaniel assisted in those studies.

24. I have read the claims filed November 8, 2005. The waveforms tested as discussed above and the output of the commercially successful TASER model M26 discussed below are within the ranges recited in those claims. A combination of ranges of more than one variable was found to be critical to accomplish halting of locomotion. The critical combination of ranges is recited in those claims.

25. After completing the design of the TASER model M26, TASER International, Inc. has conducted extensive human testing of the M26 output waveform to evaluate its effectiveness. In one study, 20 volunteers were given the goal of approaching physically attacking the electronic control device operator. With the model 34000, 100% of the volunteers were able to hit at a distance of about 10 feet from the operator and were able to traverse the distance and attack the operator. With the model M26, 100% of the volunteers were unable to walk toward the operator nor attack the operator. TASER International has repeated this testing on hundreds of volunteers with the same results. The claimed waveform improves electronic control device effectiveness against motivated subjects from 0% with prior art electronic control devices to 100% with the invented electronic control device waveform. This has been proven true not only in comparison to the model 34000 electronic control device design, but also with respect to every commercially available model of electronic control device. It is my understanding that all tests yielded the same result, particularly, prior art electronic control devices failed to halt locomotion of a motivated subject. Only the claimed waveform is effective to halt locomotion by the subject relative to any prior art.

26. The success of the TASER model M26 allowed us to become a publicly traded company. The M26 was introduced in late 1999, and experienced immediate commercial success. From 1999 to 2003, the M26 electronic control device was the core product of TASER International, Inc. The success of the M26 is due primarily to the effectiveness of the claimed combination of electrical parameters that accomplish halting of locomotion.

27. The TASER M26 was marketed to law enforcement agencies primarily by live demonstration of its effectiveness. Hans Marrero and I conducted these demonstrations throughout the United States beginning in 1999.

28. The TASER M26 commanded a higher price in the market because it halted locomotion where the Air TASER 34000 did not. I am not aware of any M26 customer's purchase decision made primarily on the basis of the data port function of the M26, absent from the Air TASER 34000.

29. From 1999 to 2003, the TASER M26 out sold Tasertron products in the law enforcement market for electronic control devices having a remote stun function. By 2003, over 125 police agencies specified the model M26 electronic control device as "standard equipment," which means that one M26 electronic control device is issued to every patrol officer in their department. Agencies that have deployed the M26 electronic control device to every officer in their department include the Sacramento Police Department, the Reno Police Department, the Albuquerque Police Department, and the Ohio State Patrol. In July, 2003, TASER bought Tasertron and discontinued production of Tasertron products. A competitor in the law enforcement market, Law Enforcement Associates, was organized in 2002 and began development of electronic control devices but did not announce an electronic control device product before 2005.

30. By 2001, the model M26 was already recognized by the law enforcement market as the market leader for electronic control devices. The events of September 11, 2001 brought increased demand for non-lethal weapons. It is my understanding that United Airlines selected the TASER M26 electronic control device as its non-lethal weapon of choice to defend its cockpits after the events of September 11, 2001. The United Airlines employees charged with selecting a cockpit defense system were personal friends of the pilots and crew of United Flight 93, and were committed to selecting the most effective weapon system available to defend their cockpits. That United Airlines weapons evaluation team ultimately selected the M26 electronic control device, even over firearms, because they personally confirmed that the M26 electrical output consistently halted locomotion by motivated subjects. By 2003, United Airlines had purchased over a thousand M26 weapons, 2 for every aircraft in their fleet.

31. Pursuant to the terms of 28 U.S.C. §1746, I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. The declarations made herein are made with the knowledge that willful false statements and the like are punishable by fine, imprisonment, or both under 18 U.S.C. §1001 and may jeopardize the validity of the present patent.

P.W. Smith — Declarant's Signature

1/5/6 — Date

State of Arizona
Maricopa County

On 1/5/06 (Date) Patrick W. Smith (Name) CEO (Title) personally appeared before me, known to me or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this instrument and acknowledged to me that he or she executed the same in his or her authorized capacity, and that by his or her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal:

Paula N. Huffman — Signature

Seal

OFFICIAL SEAL
PAULA N. HUFFMAN
Notary Public - State of Arizona
MARICOPA COUNTY
My Comm. Expires Feb. 6, 2007